Item ID Number	00319
Author	
Corporate Author	
Report/Article Title	Typescript: Summary: Operation Rand Hand, South Vietnam, 1961-1971
Journal/Book Title	
Year	0000
Month/Day	
Color	☐
Number of Images	3
Description Notes	Summary inclues mission, aircraft, spray system, personnel numbers, bases, herbicides, handling operations, application parameters, and environmental fate information

SUMMARY

OPERATION RANCH HAND, SOUTH VIETNAM, 1961-1971

MISSION: 1. Defoliate vegetation to improve visibility and decrease risk of ambush.
2. Destroy enemy crops.

AIRCRAFT: UC-123K. The "C-123" aircraft was a two engine cargo aircraft brought into the Air Force inventory in 1955-56. It was used extensively in Vietnam to haul cargo and personnel. It was frequently called the "Provider". The "U" designated modification for aerial spraying. The "K" designated modification with jet boosters.

SPRAY SYSTEM: MC-1 "Hourglass" Spray System, 1961-1964. 1,000 gallon tank tied-down in a semi-permanent configuration.
A/A 45Y-1 Internal Defoliant Dispenser, 1965-1971. A 1,000 gallon tank mounted on rapidly-deployed pallets.

NUMBER OF AIRCRAFT:
1962 --- 3
1964 --- 4
1965 --- 7
1966 --- 17
1967 --- 19 (1 aircraft for insecticide missions)
1968 --- 31 (2 aircraft for insecticide missions)
1969 --- 33 (3 aircraft for insecticide missions)
1970 --- 12 (3 aircraft for insecticide missions)
1971 --- Unit disbanded (Insecticide missions continued)

RANCH HAND PERSONNEL: (Identified/verified to date)

Tours: Temporary Duty (TDY)- Nov 1961-Jun 1964
Permanent Party (PCS)- Jul 1965-1971

Population Description:

Number of Officers = 442 (Pilots, Navigators and selected support personnel)
Number of Enlisted = 718 (Console Operators, Flight Engineers, Aircraft Mechanics and most support personnel)
TOTAL = 1,160

Initial Records Review:

Active Duty Personnel	= 332
Retired Personnel	= 436
Separated Personnel	= 350
*Dead (Included KIA)	= 42
TOTAL	= 1160

*Not full mortality data

OPERATION RANCH HAND SUMMARY CONTINUED

RANCH HAND BASES: Tan Son Nhut, Nov 1961-1965 (Squadron Headquarters)
Bien Hoa, 1966-1971 (Squadron Headquarters)
Da Nang, 1966-1971 (Operating Location)
Phu Cat, 1967-1971 (Operating Location)

HERBICIDES:

Code Name	Herbicide	Quantity (Gallons)	Period of Use
Orange	2,4-D; 2,4,5-T	10,646,000	1965-1970*
White	2,4-D; Picloram	5,633,000	1965-1971**
Blue	Cacodylic Acid	1,150,000	1962-1971**
Purple	2,4-D; 2,4,5-T	145,000	1962-1965
Pink	2,4,5-T	123,000	1962-1965
Green	2,4,5-T	8,200	1962-1965
		17,705,200	

* Last RANCH HAND mission of Orange 16 April 1970
** Last RANCH HAND missions January 1971

TCDD CONCENTRATIONS:

Herbicide Purple:
5 Samples, Range: 17-47 ppm TCDD
Mean: 32.8 ppm TCDD

Herbicide Orange:
488 Samples, Range: 0.02-15 ppm TCDD
Mean: 1.98 ppm TCDD

HANDLING OPERATIONS:

Herbicides shipped in 55-gallon drums
Drums marked with colored bands, Transportation Control Numbers and Vietnam destination
Shipping time from U.S. to Vietnam approximately 50 days
Less than 0.1% of the drums defective (leakers)
Distribution in South Vietnam:
65% to Saigon
35% to Da Nang
Drums transported in trucks to RANCH HAND Squadron
Herbicide transferred to F-6 trailers
Drum drippings for use on base perimeters (not applied by RANCH HAND personnel)
Aircraft loaded from F-6 trailers

OPERATION RANCH HAND SUMMARY CONTINUED

APPLICATION PARAMETERS (UC-123K/AA 45Y-1):

Speed: 130 KIAS
Altitude: 150 Feet
Tank Volume: 1,000 Gallons
Spray Time: 3.5 to 4 Minutes
Mean Particle Volume: 0.6 Microliters
Spray Swath: 260±20 Feet
Mean Deposition: 3 Gallons/Acre
Total Area/Tank: 340 Acres

ENVIRONMENTAL FATE:

Fate in Air (Herbicides):

Particle Size

<100 Microns ----- 1.9%
100-500 Microns - 76.2%
>500 Microns ----- 21.9%

87% Impacted Within 1 Minute
13% Drifted/Volatilized
Photodegradation Limited

Fate on Vegetation (Herbicides):

Multicanopy Forest Intercepted Approximately 94%
Ground Level Deposition Approximately 6 %
(0.17 gallons/acre = 1.4 pounds/acre)
Penetration of Ester Formulation into Vegetation
Very Rapid (within 30 minutes)

Fate in Soils (Herbicides):

In Tropical Soils the Half-Life of 2,4-D = 7 Days
In Tropical Soils the Half-Life of 2,4,5-T = 14 Days
Site of 3 gallons/acre Supported Crop Growth in
4 Months

Environmental Fate of TCDD:

Rapid Photodegradation in Air and on Plant Surfaces
in the Presence of Herbicides
(Crossby, >98% in 6 Hours)
(Nash, 86% in 32 Hours, Shade)
Minimal Translocation in Plants
Negligible Plant Uptake of TCDD from Soils
On Soils, 20% Photodegrades in 6 Hours
In Soils, the Half-Life (with Herbicides) is 1 Year
In Soils, the Half-Life(without Herbicides) is 3 Years

TCDD Bioaccumulated in Selected Organs of
Animals Associatd with Contaminated Soil